

**24.1. Model:** Balmer's formula predicts a series of spectral lines in the hydrogen spectrum.

**Solve:** Substituting into the formula for the Balmer series,

$$\lambda = \frac{91.18 \text{ nm}}{\left(\frac{1}{2^2} - \frac{1}{n^2}\right)} \Rightarrow \lambda = \frac{91.18 \text{ nm}}{\frac{1}{2^2} - \frac{1}{6^2}} = 410.3 \text{ nm}$$

where  $n = 3, 4, 5, 6, \dots$  and where we have used  $n = 6$ . Likewise for  $n = 8$  and  $n = 10$ ,  $\lambda = 389.0 \text{ nm}$  and  $\lambda = 379.9 \text{ nm}$ .